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Enhanced luminescence in Er-doped Si nanoparticles TUAN HOANG, KEVIN MANTEY, MUNIR NAYFEH, University of Illinois, Urbana-Champaign — We have studied the effect of Er ions on the luminescence of the 1-nm and 2.9-nm Si particles in solution. Under UV illumination, the 1-nm and 2.9-nm Si particles are known to have broadband luminescence in the blue and red region, respectively. We observed an enhancement in the luminescence of the particles with increasing concentration of Er ions. We discuss the result in terms of doping of the nanoparticles with Er ions. Preliminary DFT calculation shows that the ion can form a stable state just inside the particle. In this state, the electric field of the Er ion changes the bond length of the dimers, which are believed to be responsible for the optical activity of the particles.

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